## REMARKS

This amendment is being filed with an RCE application.

Applicant appreciates the analysis provided in the Advisory Action mailed July 21st.

Claims 1 and 13 have been amended in consideration of the Advisory Action.

No new matter has been entered.

The application is believed to be in condition for allowance.

The previous formal objections/rejections have been withdrawn.


### Claim Rejections – 35 USC § 103

Claims 1, 3-6, 8-13, 16, 17, and 20-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,481,973 to Struthers in view of US Patent 4,945,491 to Rishel.

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Struthers in view of Rishel as applied to claims 1 and 13, and further in view of US Patent 2,462,076 to Dryden.


The rejections are traversed.

Independent claims 1 and 13 have been amended to recite (inter alia) that:

(a) a first moment (e.g. moment 'a' in figure 3a) when a liquid surface level reaches a first value of the liquid surface level from a predetermined direction is detected,

(b) as a consequence of the detection of the first moment, pump rotation speed of one of at least two pumps is controlled to a first value of the pump rotation speed,

(c) the one of said at least two pumps is run at the first value of the pump rotation speed in order to move the liquid surface level in a direction opposite to the predetermined direction,

(d) there is detected a second moment (e.g. moment 'b' in figure 3a) when the liquid surface level reaches, from the direction opposite to the predetermined direction, a value of the liquid surface level that is later in the direction opposite to the predetermined direction than the first value of the liquid surface level, and (e) as a consequence of the detection of the second moment, the one of said at least two pumps is controlled to be stopped.

The above-defined operation is described, e.g., in figure 3a and in the text passages explaining figure 3a in the original application. Therefore, the amendments are supported by figure 3a and by the text passages explaining figure 3a in the description.

The Claims Are Non-obvious

Struthers discloses a method for operating a variable speed pump driven by a motor capable of developing high torque at low speeds. The method comprises increasing the rotational speed if (see figures 5A and 5B of Struthers):

- the tank is not empty (block 124),

- the pump is not clogged (block 126),

- pumping is less than 10 gallons per minute (block 128), and

- the rotational speed is not already at its maximum value (block 130).

If the pump is clogged, the rotational speed is decreased (blocks 126 and 134). It is determined, by assessing the torque being generated by the motor, whether the pump is clogged. When the torque being developed by the motor exceeds a maximum defined for the rotational speed being used or attempted to be used, the rotational speed is reduced and the maximum acceptable torque for the motor is thereby increased. The torque is then permitted to rise unless and until it exceeds a maximum defined for the reduced speed.

Rishel (US4945491) discloses a method and apparatus by which the efficiency of a multi-pump pumping system may be accurately determined, and the individual pumps thereof selectively energized and de-energized to optimize the efficiency of the system. In figure 1 and in the text passages explaining

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figure 1, Rishel describes a fixed speed pumping system in which individual pumps are energized and deenergized to optimize the efficiency of the pumping system. Rishel teaches a method to determine efficiency of the pumping system in order to be able decide when to energize and when to de-energize one or more of the pumps. In figure 2 and in the text passages explaining figure 2 Rishel describes a variable speed pumping system in which the pump speeds are varied on the basis of e.g. flow rate, pressure, temperature, level or the like.

In the technical solution recited in the amended independent claims, the pump rotation speed is controlled as a response to two different situations in each of which the liquid surface level reaches a certain value from a certain direction, i.e. in terms of the amended independent claims:

(a) a first moment (e.g. moment 'a' in figure 3a) when a liquid surface level reaches a first value of the liquid surface level from a predetermined direction is detected,

(b) as a consequence of the detection of the first moment, pump rotation speed of one of at least two pumps is controlled to a first value of the pump rotation speed at which amount of transferred liquid relative to consumed energy is at maximum,

(c) the one of said at least two pumps is run at the first value of the pump rotation speed in order to move the

liquid surface level in a direction opposite to the predetermined direction,

(d) there is detected a second moment (e.g. moment 'b' in figure 3a) when <u>the liquid surface level reaches, from the direction opposite to the predetermined direction, a value of the liquid surface level that is later in the direction opposite to the predetermined direction than the first value of the liquid surface level</u>, and

(e) as a consequence of the detection of the second moment, <u>the one of said at least two pumps is controlled to be stopped</u>.

Neither Struthers nor Rishel discloses the principle of controlling the pump rotation speed as a response to the two different situations in each of which the liquid surface level reaches a certain value from a certain direction. In other words, neither Struthers nor Rishel discloses the above-mentioned technical features (d) and (e) of the amended independent claims.

The technical solution defined in the amended independent claims makes possible to have a pumping system in which the liquid surface can be kept between two pre-determined limit values and the pumps can be used so that each pump is either de-energized, i.e. no losses, or run at a speed at which amount of transferred liquid relative to consumed energy is at maximum. Hence, the liquid surface can be kept consumption without a need to determine the wire-to-water efficiency <u>on-line</u>

because the speed at which amount of transferred liquid relative to consumed energy is at maximum can be determined off-line.

In the system disclosed by Rishel, there is a need to determine the wire-to water efficiency on-line during operation; actually Rishel teaches a method to monitor and determine the efficiency in order to be able to control the system, see e.g. the abstract of Rishel.

Struthers does not even handle the problem of optimizing the efficiency of a pumping system. Instead, Struthers deals with achieving a desired pumping rate and recovering from clogging situations.

The cited prior art disclose nothing that would lead a skilled person to modify the technical solution disclosed by Struthers or the technical solution disclosed by Rishel so that the skilled person would arrive at the technical solution defined in the amended independent claims.

Hence, the amended independent claims are non-obvious over the cited prior art. The dependent claims are also non-obvious at least for depending from non-obvious independent claims.

Reconsideration and allowance of the claims are respectfully requested.

This response is believed to be fully responsive and to put the case in condition for allowance. Entry of the amendment, and an early and favorable action on the merits, are earnestly

requested. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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